

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/11802

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A01N 63/00; C12N 1/20

US CL : 424/234.1, 257.1, 258.1, 93.1, 93.2, 93.4; 435/243, 252.3

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 424/234.1, 257.1, 258.1, 93.1, 93.2, 93.4; 435/243, 252.3

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	Database BIOSIS on STN, NO. 200200609166. ZHANG et al. "Salmonella typhimurium UK-1 DELTAfur::araC PBADfur DELTApmi mutants are highly attenuated and induced protective immunity in BALB/c Mice." Abstracts of the General Meeting of the American Society for Microbiology. May 2002, Volume 102, pages 512-513, Abstract.	1-29
Y	COLLINS et al. Mutations at rfc or pmr Attenuate Salmonella typhimurium Virulence for Mice. Infection and Immunity. March 1991, Volume 59, Number 3, pages 1079-1085, see entire document.	1-29
Y	KENNEDY et al. Attenuation and Immunogenicity of DELTAcyA DELTAcrp Derivatives of Salmonella choleraesuis in Pigs. Infection and Immunity. September 1999, Volume 67, Number 9, pages 4628-4636, see entire document.	1-29
Y	HANTKE. Selection procedure for deregulated iron transport mutants (fur) in Escherichia coli K 12: fur not only affects iron metabolism. Mol. Gen. Genet. 1987, Volume 210, pages 135-139, see entire document.	1-29



Further documents are listed in the continuation of Box C.



See patent family annex.

<p>* Special categories of cited documents:</p>	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

09 July 2003 (09.07.2003)

Date of mailing of the international search report

24 OCT 2003

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (703)305-3230

Authorized officer

Patricia A. Duffy

Telephone No. 703-308-0196

# INTERNATIONAL SEARCH REPORT

PCT/US03/11802

## C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DARZINS et al. Nucleotide sequence analysis of the phosphomannose isomerase gene (pmi) of <i>Pseudomonas aeruginosa</i> and comparison with the corresponding <i>Escherichia coli</i> gene <i>manA</i> . <i>Gene</i> . 1986, Volume 42, pages 293-302, see entire document.	1-29
Y	WO 91/06317 A1 (WASHINGTON UNIVERSITY) 16 May 1991 (16.05.91), see entire document.	1-29
Y	WO 98/56901 A2 (MEDICAL RESEARCH COUNCIL) 17 December 1998 (17.12.98), see entire document.	1-29

**INTERNATIONAL SEARCH REPORT**

PCT US03/11802

**Continuation of B. FIELDS SEARCHED Item 3:**

MEDLINE, EMBASE, CAB ABSTRACTS, WEST.

SEARCH TERMS: PMI, FUR, ATTENUAT?, ENTEROBAC?, SALMONELLA, VACCINE, DIFFERENTIAL EXPRESSION IN VIVO OR IN VITRO.